Occupational Safety, Health, and Environmental Requirements

A Training Class for Employees

Class Overview

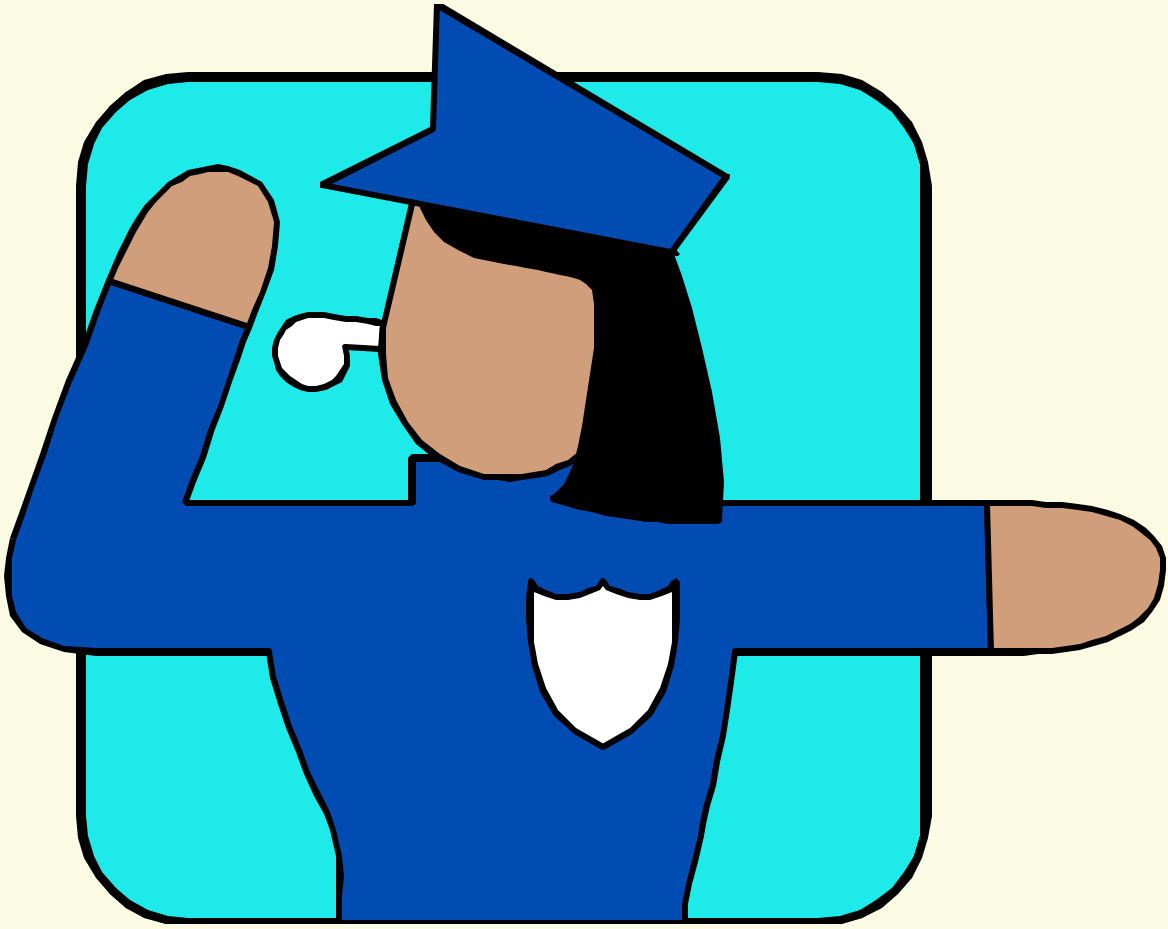
- Organizational Overview
- Roles and Responsibilities
- Regulatory Overview
- Key Programs
  - Safety, Health, and Environmental

Objectives

- Knowledge of key HSE programs
- Appreciation of responsibilities
- Understanding liabilities
- Awareness of GRC resources
- Ability to address issues

Why are we doing this?

It’s not because we’re Safety Police.

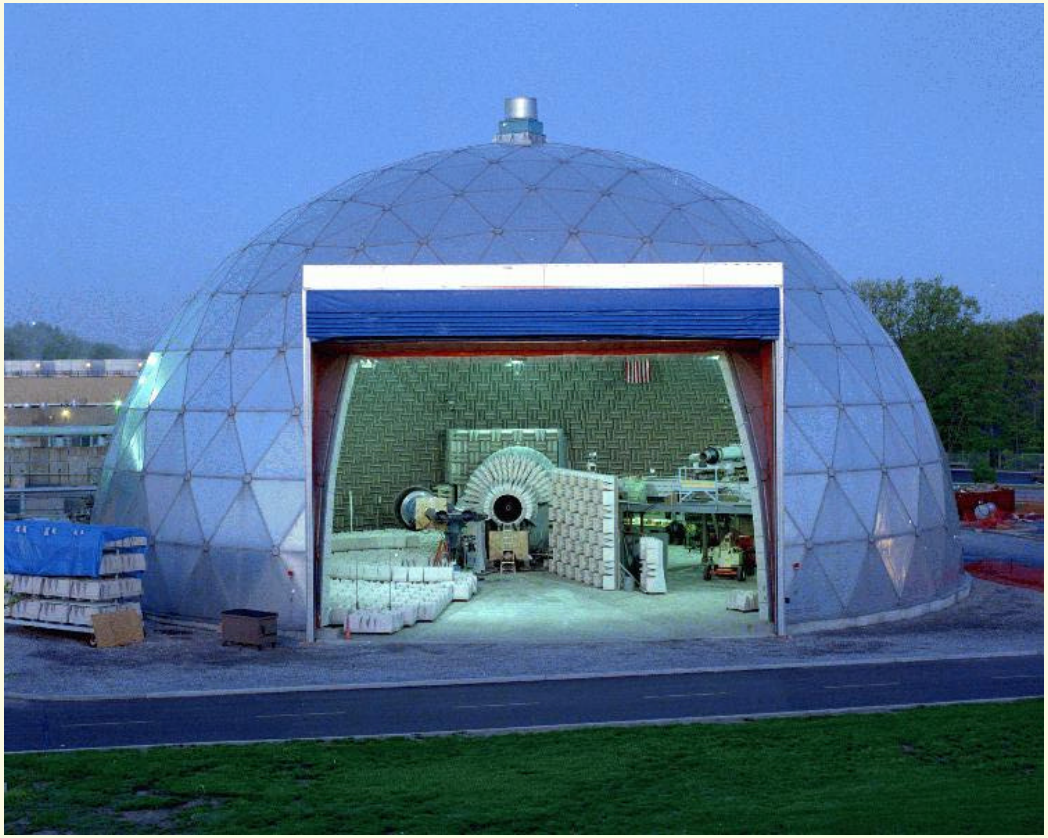


It’s not because we’re tree huggers.

It’s not because we want to keep you out of Jail.

We Enable NASA

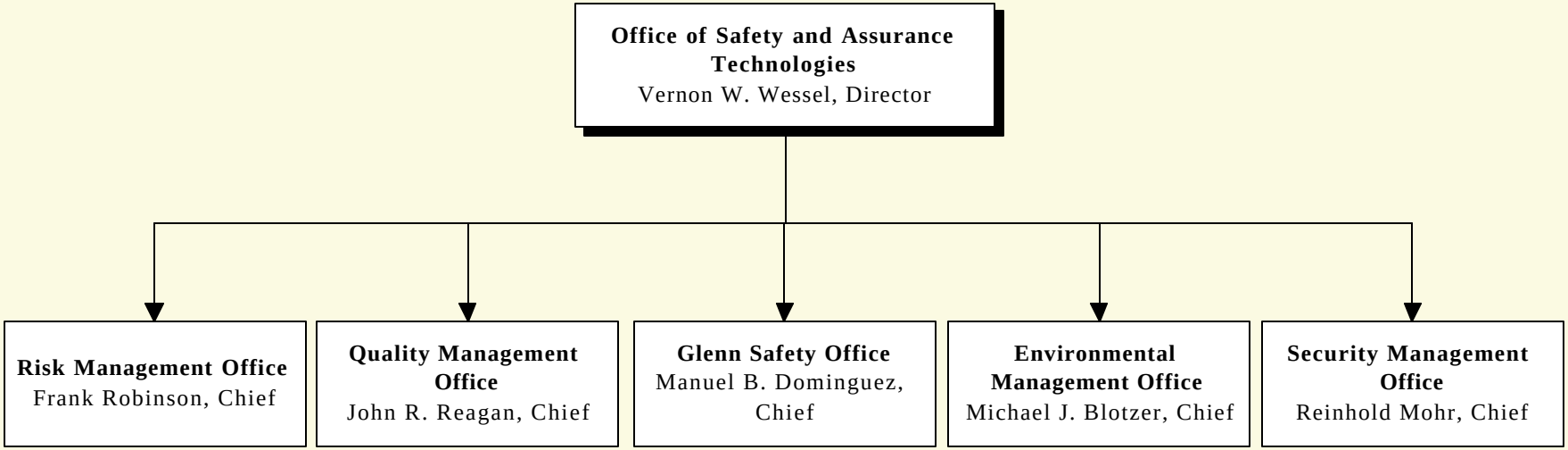
- Protect employees
- Protect the public
- Minimize future liability



OSAT Mission

The Office of Safety and Assurance Technologies (OSAT) effectively and visibly leads safety, security and quality at Glenn as a valued partner with our customers. OSAT provides a clear Safety, Reliability, Maintainability, Quality Assurance (SRM&QA) and Security voice in programmatic and technical decision-making and implementation.

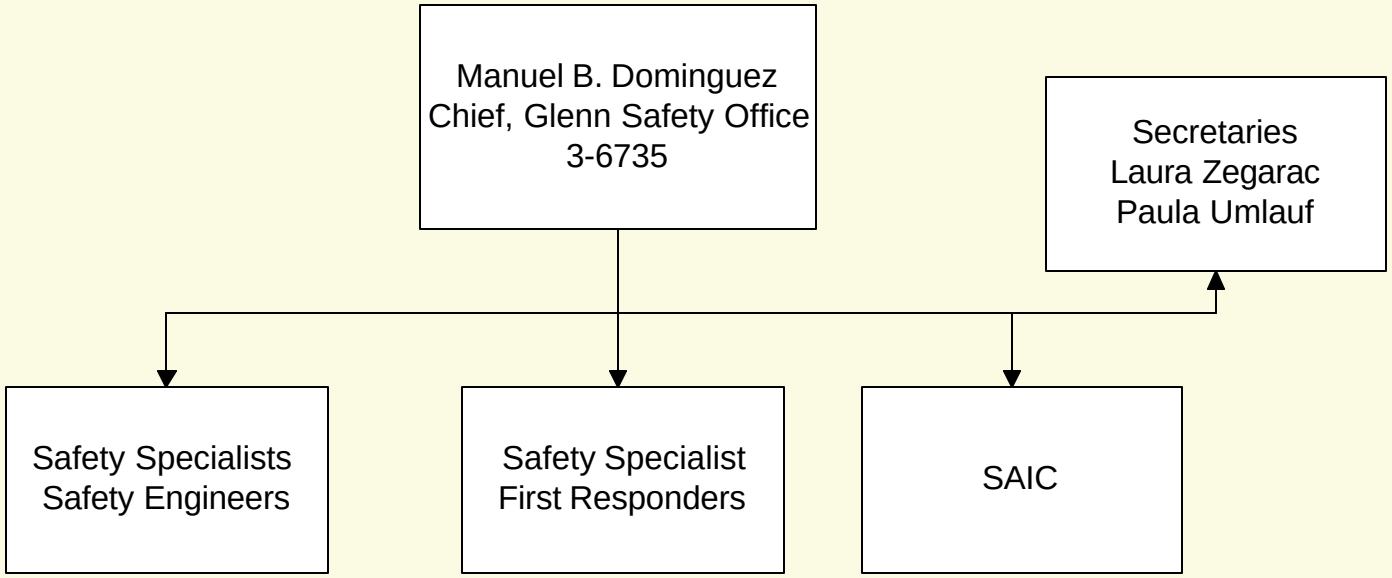
OSAT Organization



GSO Mission

The Glenn Safety Office provides services to our customers and partners to ensure a safe workplace for all Center operations while ensuring that all Agency requirements are met.

GSO Organization



Ken O'Connor
Mack Thomas
Sell James Jr.
Thomas Eakin
Carl Brown
Robert Allen
Teresa Mills
Frank DeAngelo

Mark Smith
Mark Neading
Gary Wilder
Lou Galmarini
Glenn Jolliffe
David Mount

Mike Dyke
Deborah Ripley
Hugh Schoeffler
Dallas Jenkins
Robert Graham
Colman Zsiros
Steve Hershman

GSO Responsibility

- Provide guidance on program requirements
- Develop a Partnership with all Contractors
- Communicate with COTRs and Contractor Representatives
- Ensures Regulatory Compliance with Federal, State and Local Requirements

GSO Programs

ASI	Mack Thomas
Construction Safety	Robert Allen
Barricades	Lou Galmarini
Confined Spaces	Dallas Jenkins
Cranes	Frank DeAngelo
Mishap Prevention	Deborah Ripley
PPE	Steve Hershman
Fire Protection	Thomas Eakin
Safety Permit	Ken O’Connor
Process Safety	Colamn Zsiros

GSO Programs
(Cont.)

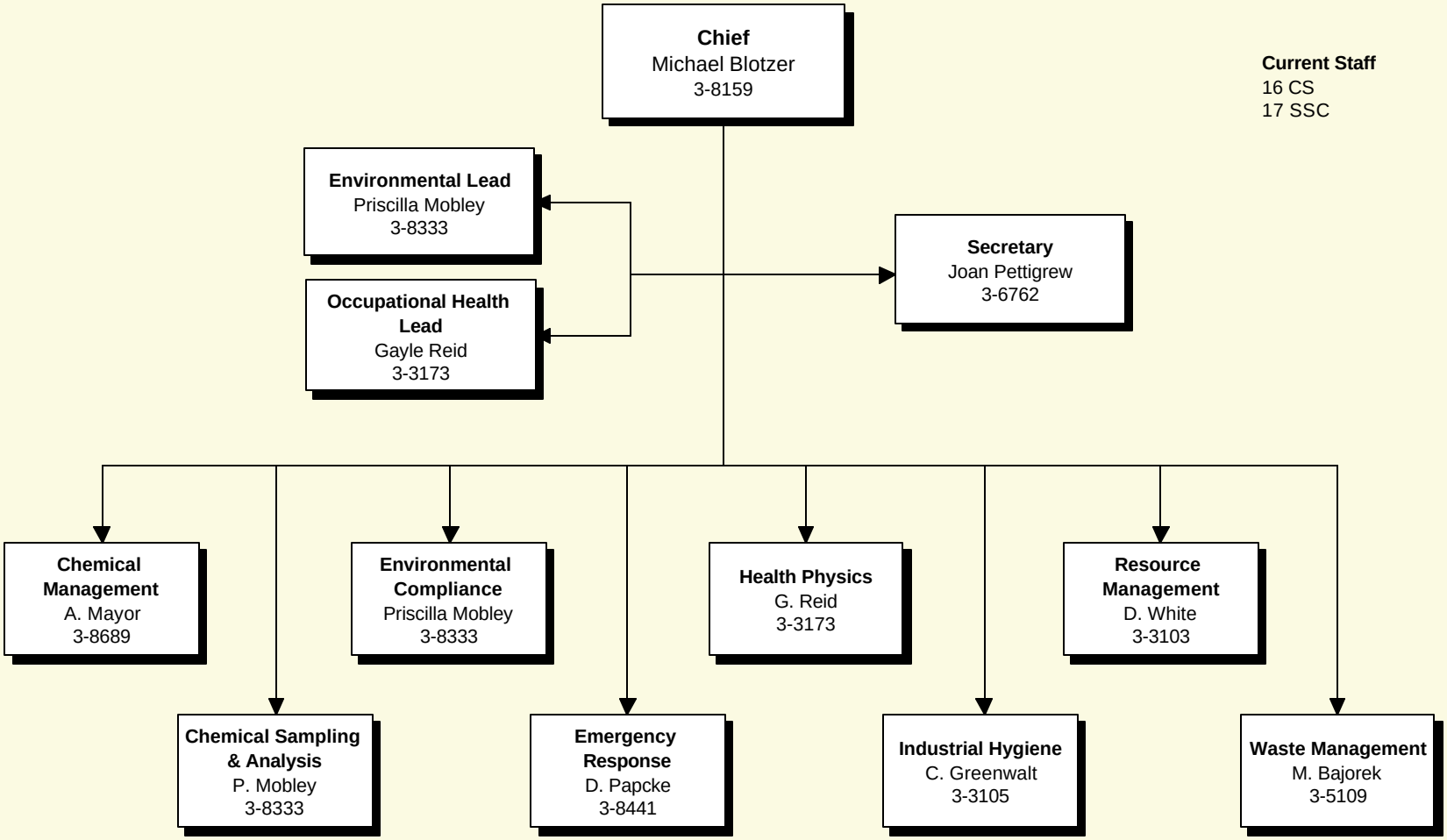
Shop Safety	Carl Brown
Safety Training	Terressa Mils
Lockout/Tagout	Dallas Jenkins
Explosive Safety	Robert Allen
Medical Emergencies	Mark Smith
Hazard Analysis	Sell James Jr.
Electrical Safety	Hugh Schoeffler
Glenn Safety Manual	Robert Graham
Evacuation Plans	Glenn Jolliffe
Facilities Inspections	Hugh Schoeffler

EMO Mission

To support Glenn Research Center in pursuit of its charter by ensuring the Center provides a safe and healthful workplace for its employees and operates in a manner that is protective of the environment and surrounding communities.

Environmental Management Office

National Aeronautics and Space Administration
John H. Glenn Research Center



EMO Teams

- **Chemical Management Team**
  - Assists chemical users with the chemical management process— the acquisition, transportation, handling, use, and storage – while ensuring all regulatory requirements are met.
- **Chemical Sampling and Analysis Team**
  - Provides chemical sampling and analysis services and expert consulting. services include sampling and chemical analysis of water, soil, fuels, oils, paint, and insulation materials.

EMO Teams

- **Environmental Compliance Team**
  - Educates the GRC community in its responsibilities relating to the environment and ensures activities conducted at the facility are accomplished in compliance with Federal, State, and local environmental regulations.
- **Emergency Response Team**
  - Ensures that GRC manages environmental emergencies properly. Oversees spill prevention, response, and remedial actions.

EMO Teams

- **Health Physics Team**
  - Provides the technical guidance needed to comply with governmental and institutional regulations regarding the use of ionizing and non-ionizing radiation sources, electromagnetic fields, and radio frequency generators.
- **Industrial Hygiene Team**
  - Manages key programs designed to ensure that GRC achieves its mission in a manner that protects employee's health. These programs include, lead, cadmium, OSHA regulated chemicals, respiratory protection, ventilation for worker protection, asbestos and indoor air quality.

EMO Teams

- **Resource Management Team**
  - Manages EMO BMS/ISO procedures, documents, and records. Manages the EMO budget, procurement, contracting, and technology processes. Ensures that EMO funded projects are executed with the highest degree of efficiency and effectiveness.
- **Waste Management Team**
  - Provides disposal services for hazardous materials ensuring compliance with all Federal and State laws and regulations.

Roles and Responsibilities

Roles and Responsibilities

- Outlined in Chapter 1 of Glenn Safety and Environmental Programs Manuals
- Includes Roles and Responsibilities for
  - Supervisors
  - Employees
  - Glenn Safety Office
  - Environmental Management Office

Roles and Responsibilities

- Employer
  - furnishes a place of employment that is free from recognized hazards that are causing or likely to cause death or serious physical harm.
  - Complies with environmental regulations and acts to reduce future environmental liability
- Employee
  - understands and complies with safety, health, and environmental standards and all rules, regulations, and orders issued

Roles and Responsibilities

- Supervisors
  - Make sure work gets done safely
  - Directly influences the workers, their priorities, and how tasks are performed
- GSO/EMO
  - Training
  - Policies/Procedures
  - Technical Assistance

Supervisor's Responsibilities

- They include:
  - Knowledge of, and adherence to, GRC Safety, Health and Environmental Programs
  - Knowledge of the Safety Permit/Environmental Permits Requirements
  - Identification, communication and correction of hazards in the work area
  - Development of operational and safety, health and environmental procedures related to the operation
  - Ensuring the employees receive safety, health and environmental training

Basic Principles

- Employee is key
- Plan with safety, health and environment in mind
- Control hierarchy
  - Eliminate hazards by design
  - Engineering controls
  - Administrative controls
  - Personal Protective Equipment (PPE)

Employee's Responsibilities

- They Include:
  - Performing his/her duties in a safe manner.
  - Complying with all regulatory requirements, work procedures and guidance.
  - Reporting injuries, illnesses and any hazards or unsafe conditions to his/her supervisor.

Regulatory Overview

Regulatory Drivers

- Occupational Safety & Health Administration
  - General Industry and Construction
- Environmental Protection Agency
  - Air, Land, Water, Groundwater
- Nuclear Regulatory Commission
  - Radioactive materials
- Ohio EPA
- City of Cleveland

Standards Organizations

- Consensus standards are recognized basic standard of care.
- Failure to adhere to them is a liability
- Include
  - ANSI
  - ASHRAE
  - ASTM
  - ACGIH
  - NFPA

NASA Policies and Procedures

- NASA-Wide
  - Related NPD's and NHB's
- Glenn Research Center
  - ISO 9001 Business Management System
  - Glenn Safety Manual
  - Glenn Environmental Programs Manual

GRC Occupational Safety Programs

Agency Safety Initiative (ASI)

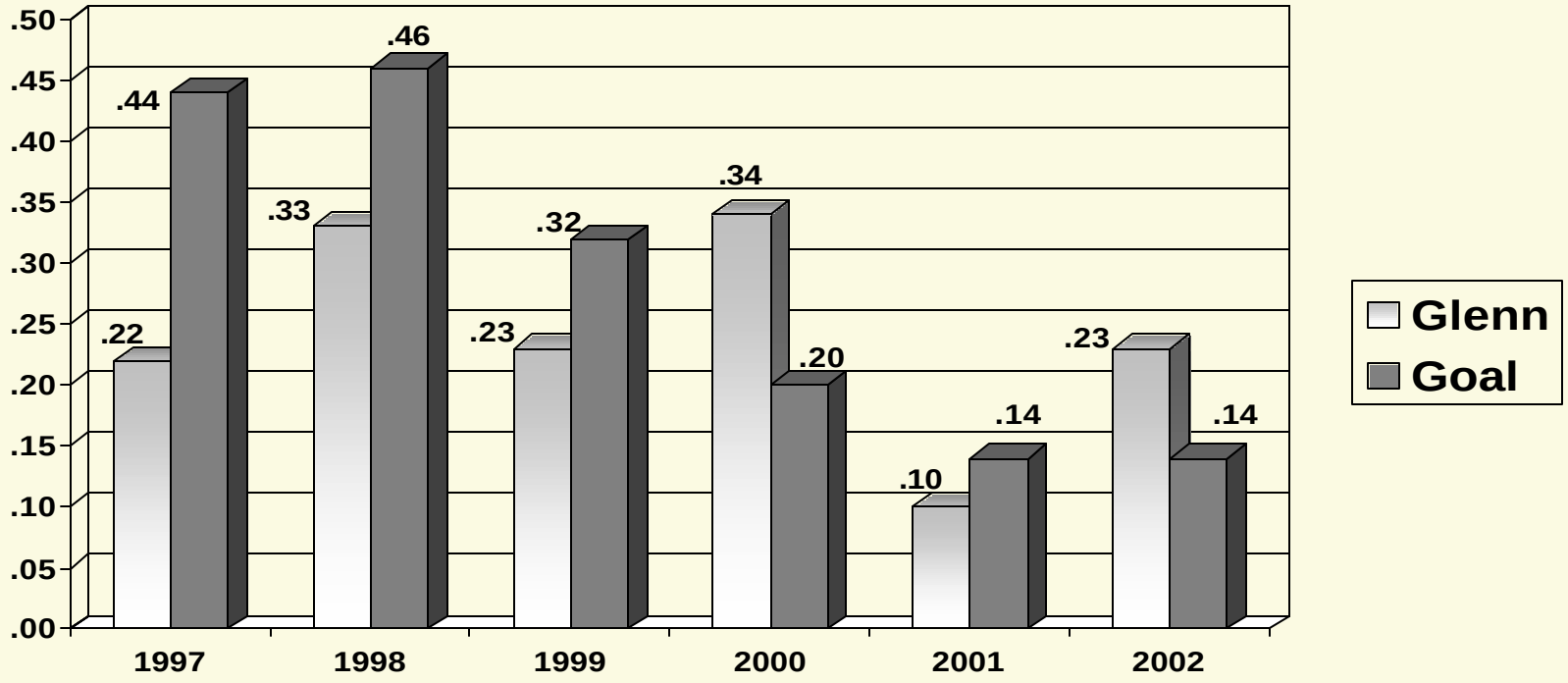
- Agency Wide Program to Improve Safety
- Hierarchy of Protection:
  - Public
  - Astronauts and Pilots
  - Employees
  - High Value Equipment and Facilities

Agency Safety Initiative

- Expectation:
  - “Zero Mishaps in the NASA Workplace.”
- Goal:
  - “Making NASA the nation’s leader in the safety and occupational health of our work force and the safety of the products and services we provide.”

Civil Service Lost Time Rate Fiscal Year 2002

Lost Time Rate (LTR)



Civil Service Lost Time Incidents Fiscal Year 2002

DIRECTORATE	TOTAL INCIDENTS	TOTAL DAYS LOST	DESCRIPTION
0100 Office of the Director	1	1	Employee was going down some steps and holding onto the handrail and it moved. Fell three steps and twisted ankle.
0600 Office of Acquisition	1	1	Employee slipped on tile floor and fell forward
7000 Engineering and Technical Services Directorate	1	3	Employee was moving items around. Bent over while twisting at the same time to prevent a pipe from rolling off the cart and lower back pulled

GRC FY02 Safety and Health Goal Status

- Lost time case rate reduction goal of 10%
- GRC goal for lost time rate of .14
- Lost production days rate reduction goal 2%
- Injury/illness occurrences goal of 3% reduction.

Voluntary Protection Program

- **VPP is a Tool that assesses & certifies the health of your safety program**
  - **Designed as a review and assessment of workplace safety programs**
  - **Focuses on "Cultural Change"**
  - **Recognizes exemplary Center Health and Safety Plan (HASP)**
- **Benefits for both Include:**
  - **Fewer injuries, reduced cost of doing business**
  - **Increased worker productivity due to more healthful work force**
  - **Recognition in the community**
- **There are three VPP ratings**
  - **STAR - Exemplary Safety Program**
  - **Merit - Safety program is Good, But Needs Improvement**
  - **Demonstrative - A Formal Safety Program is in Place**

ASI and VPP

ASI is mandated by NASA HQ

- **Designed to reduce NASA Loss time incidents**
- **Focuses on “Institutional and System Safety” AND “Cultural Change”**
- **Requires exemplary center Health and Safety Plan (HASP)**

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- **Increased worker productivity due to more healthful work force**
- **Recognition in the community**

Core Processes for ASI and VPP Elements are the same

ASI/VPP Elements

- Management Commitment and Employee Involvement
- Worksite Hazard Analysis
- Hazard Prevention and Control
- Safety and Health Training

Management Commitment and Employee Involvement

- Glenn Safety Program
- Executive Safety Board
- Area Safety Committees
- Labor Management Safety and Health Council

Worksite Hazard Analysis

- Hazard Analysis Program
- Safety Permit Process
- Oxygen/Hydrogen Safety
- Process Systems Safety
- Construction Safety
- Ergonomics
- Fire Protection
- Facilities Inspections

Hazard Prevention and Control

- Mishap Reporting
- NASA Safety Reporting System
- Confined Spaces
- Lockout/Tagout
- Area Clearances
- Hot Work Permits
- Personal Protective Equipment Program
- Emergency Response
- Safety, Health and Environmental Help Line

Safety and Health Training

- Supervisor Training
- Employee Training
- New Employee Training
- Interns/Faculty Training
- Technical Safety Training

Supervisor's Support for VPP

- **Clear Management Involvement**
  - **Safety Walk Through's, Meetings**
  - **Safety Goals communicated to employees**
  - **Performance Plans and Reviews**
  - **Monthly Safety Meetings**
  - **Self Inspections**
- **Safety Incentives Program for Employees**
- **Participation in Center Safety Events**
- **Ensure Contractors are accountable for safety**
- **Involve employees in closing PEP recommendations**
- **Establish a To Do List for VPP success**

Employee's Support for VPP

- **In order to ensure the success of this effort, Glenn employees need to:**
  - **Be visibly supportive of the certification effort**
  - **Know the safety requirements of your job**
  - **Know the information contained in the Employee Safety Pocket Guide**
  - **Ensure that your work area is clean, free from unsafe conditions, and ready for the on-site inspection**
  - **Immediately report injuries,first aid and close call to their supervisors**
  - **Train newly hired employees in safe work procedures and rules**
  - **Participate as members of Area Safety and Health Committees**

Supervisor's Responsibilities

- They include:
  - Knowledge of and Adherence to GRC Safety, Health and Environmental Programs
  - Knowledge of the Safety Permit/Environmental Permits Requirements
  - Identification, communication and correction of hazards in the work area
  - Development of operational and safety, health and environmental procedures related to the operation
  - Ensuring the employees receive safety, health and environmental training

Emergency Response

- Call 911
- Safety Specialist responds
  - Calls additional support as required
- Notification requirements
  - GRC management
  - NASA HQ
  - Outside agencies

Mishap Reporting

- Glenn Research Center policy requires that employees immediately (within 24 hrs.) report any mishap that occurs.
  - equipment or test failure
  - plant, vehicle, or aircraft accident
  - environmental or other incident
  - and close calls

Mishap Reporting

- A Mishap is any unplanned occurrence, event, or that has at least one of the following criteria:
  - Injury
  - Lost Time over 8 hours
  - Loss of Life
  - Damage of NASA property over $1000.00
  - Mission Failure
  - Close Calls

Mishap Reporting

Close Call

"An event which resulted in no injury, no equipment/property damage equal to or greater than $1000, and no significant interruption of productive work, but which, under slightly different circumstances, could have resulted in a type A, B, or C Mishap Failure, or Incident."

Mishap Reporting

- NASA Form 1627a - preliminary report a mishap/close call (within 24 hrs.).
- NASA Form 1627 - complete report of a mishap/close call. Includes Corrective Action Plan (within 10 days).
- Some Mishaps require an Accident Investigation Team

Wake up! It’s break time!

- 10 Minute Break

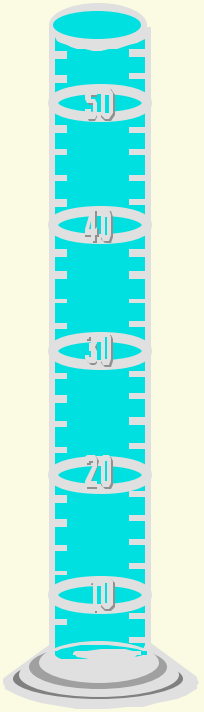
GRC Occupational Health Programs

Core Programs

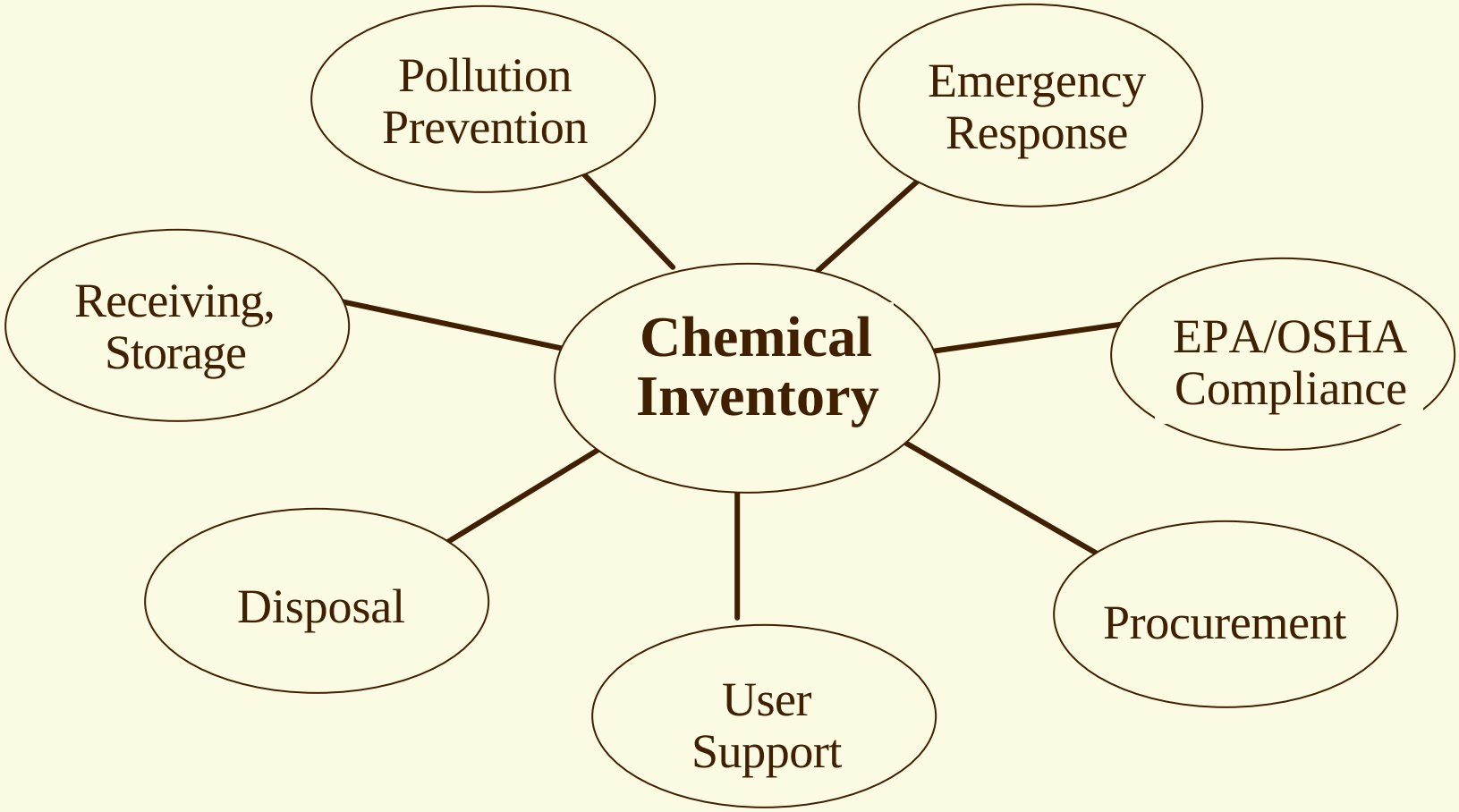
- Chemical Management
- Industrial Hygiene
- Noise
- Ionizing and Non-Ionizing Radiation

Chemical Management

- Chemical Inventory
- Hazard Communication (HazCom)
- Chemical Hygiene Plan



Chemical Management



Hazard Communication

- Written Program
- Ready access to Material Safety Data Sheets (MSDS)
  - Binders, telephone, email
  - www-osma.grc.nasa.gov
- Labeling
- Training
- Does not cover lab operations

Chemical Hygiene Plan

- Covers laboratory use of chemicals
- Written Program
- Standard Operating Procedures
  - Specific for each lab
  - Comprehensive plan
  - Coordinated with Safety Assurance Office

Hazcom & Chemical Hygiene

- Supervisor's Responsibilities
  - Identify hazards
  - Employee information & training
  - Provide access to MSDS
  - Submit forms to update chemical inventory
  - Maintain and ensure use of controls

Industrial Hygiene Programs

- Asbestos & Inorganic Fibers
- Bloodborne Pathogens
- Cadmium
- Indoor Air Quality
- Lead in Construction & Maintenance
- Local Exhaust Ventilation
- OSHA Regulated Chemicals
- Mercury
- Noise
- Respiratory Protection

Basic Principles

- Plan with health and safety in mind
- Control hierarchy
  - Eliminate hazards by design
  - Engineering controls
  - Administrative controls
  - Personal Protective Equipment (PPE)
- Training
- Medical Monitoring

Do I Have a Problem?

- Read your material safety data sheets!
  - Odor threshold, signs & symptoms, precautions
- Look for
  - Poorly controlled operations
  - Skin and eye contact
  - Standard operating procedures
  - Maintenance procedures
  - Emergency procedures

Noise Program

- Manage and control worker and community noise exposure from GRC facilities
- Hearing Conservation
- Community Noise
- Acoustical & Noise Control Engineering

- *Sun. 2:45 AM*
- *How come your brilliant scientists can't do something to silence the wind tunnel so we can sleep. Like sober up and remember to turn it off. Stupid.*

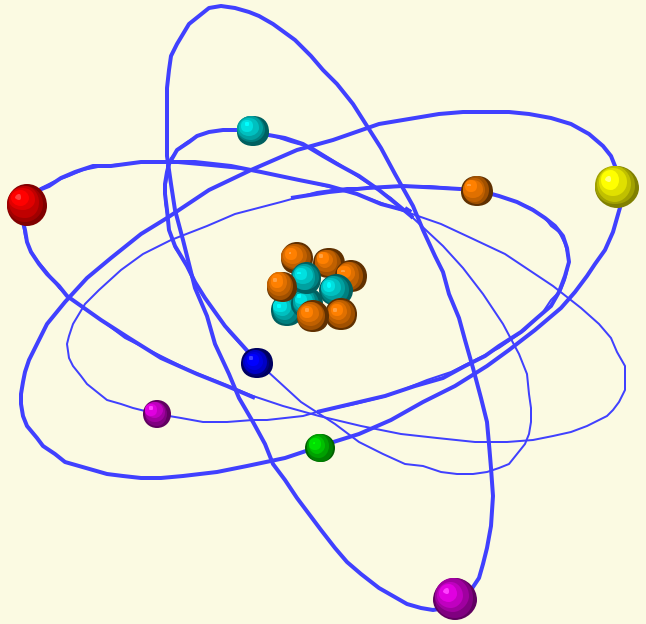
An unfriendly neighbor near Lewis Rd.

Employee Responsibility

- Notify EMO of high noise operations
- Consult with EMO on renovation projects
- Attend noise training
- Use appropriate hearing protection

Health Physics

- Ionizing Radiation
- Non-ionizing Radiation



Ionizing Radiation

- Licensed radioactive materials
- Generally licensed materials
- Cyclotron activated materials
- X-ray Units
- Plum Brook Reactor Facility
- ALARA is the law
  - As Low As Reasonable Achievable

Radioactive Materials

- NRC license must be amended for
  - change in use of a licensed source
  - procurement of new sources
- Six month lead time
  - contact Radiation Safety Officer for assistance
- All purchases of radioactive materials must be coordinated with the Radiation Safety Officer

X-ray Units

- Not licensed, covered by NRC regulations
- Require safety permit
  - Interlocks and operator training
  - personnel exposure monitoring may be required
  - periodically surveyed by the Radiation Safety Officer (RSO)
- Medical X-ray inspected annual by ODH
- Construction X-ray coordinated with RSO

Non-Ionizing Radiation

- Lasers
  - Require Safety Permits
  - Follow ANSI
  - Beam and non-Beam Hazards
- Electromagnetic radiation sources
  - communications, induction heaters
  - Safety Permits for communications sites
  - Prudent avoidance of ELF and EMF
  - Contact RSO with concerns

GRC Environmental Programs

NASA-Wide Environmental Management System

EMS Overview

- NASA-Wide System (NPG 8553)
- ISO 14001 Compliant
- Part of Center's BMS
- Environmental Program Manual is EMS Core
  - Available on WING via "Safety and Environment" link
  - Chapter 1 describes EMS structure, responsibilities
  - Other chapters are "Operational Controls"

Audit Non-Conformances

- Employees not aware of significant environmental aspects of their work
- Poor understanding that EMS is part of BMS
- Poor understanding of relevant EMS procedures and requirements

Observations

- “Disconnect” between EMS and day to day operations
- Lack of awareness of Help Line and EMS representative

Major EMS Elements

- Environmental Policy
- Planning
  - Legal & other Requirements
  - Environmental Aspects & Impacts
  - Objectives & Targets
  - Environmental Management Program
- Implementation & Operation
  - Structure & Responsibility
  - ✓ Training, Awareness & Competence
  - ✓ Communication
  - ✓ Documentation & Document & Record Control
  - Operational Controls
  - ✓ Emergency Preparedness & Response
- Checking & Corrective Action
  - Monitoring & Performance Measurement
  - ✓ Nonconformance & Corrective & Preventive Action
  - EMS Auditing
- Management Review

Environmental Policy

NASA Glenn Research Center
operates in a manner that protects and preserves the environment through pollution prevention, the
continual improvement of our operations, and complying with environmental regulations.

Planning

1. Identify Activities Products, Services

2. Identify Related Focus Areas, Environmental Aspects, and Environmental Impacts

3. Apply Risk Procedure to Determine High Priority Impacts

4. Establish Objectives and Targets for High Priority Impacts

5. Develop Environmental Management Programs to meet Objectives and Targets

Priority Impacts

- Hazardous Waste
- Spills and Releases
- Personal Injury
- Construction and Modification of Facilities

Major Elements

- Environmental Policy
- Planning
  - Objectives, targets, and metrics
- Implementation and operation
- Checking and corrective action
- Management review

Training

- Tied directly to priority impacts, environmental compliance, and EMS commitments
- Ensures employees involved with priority impacts and compliance work to meet objectives, targets, and commitments

Objectives and Targets

- Reduce spills and releases
- Correct violations within 3 months
- Pollution prevention
- Reduce solid waste

Reduce Spills & Releases

- Train Personnel
  - SPCC training in process
- ✓ Lessons Learned Distribution
  - ✓Automated through NETS
- ✓ Control/Cleanup Spills within 24 hours
  - ✓100% conformance to date

Regulatory Compliance

- Correct or resolve all regulatory items within 3 months of identification
  - No change since last report
  - Lewis Field: = 51%
  - Plum Brook Station: = 43%
  - GRC Overall = 47%

Pollution Prevention (P2) Activities

- Identify 10, Implement 5 opportunities
  - 23 opportunities identified by P2 Team
  - Implementing 6
    - Methylene Chloride substitution (3)
      - Fab Shop, Vehicle Maintenance, Paint Stripping

    ✓Propane bottle recycling
    - Oxygen line cleaning
    - Garnet recycling (HQ funding $28K)

Reduce Solid Waste

- Identify 3, implement 1 opportunity
  - 5 opportunities under evaluation
  - Improved battery recycling program
- Evaluate construction waste management
  - Team established, initial meeting 12/7
  - ✓New soil policy allows use of soil as fill

EMS Management Review

- Performed by Environmental Pollution Control Board
- Covers
  - Audit results
    - Internal EMS Audit
    - Corrective Action Status
  - Objectives and Targets Progress
  - EMS suitability, adequacy, effectiveness

EMS Benefits

- Identify & focus on GRC's Objectives and Targets
- Improved training & communication
- Integration with GRC core business and QMS
- Proactive approach to environmental protection
- Improved environmental performance, compliance
  - air, water, soil quality through increased awareness of environmental issues among employees, stakeholders
  - Promotes efficiencies, improves operations and reduces costs associated with P2 and enforcement actions

Environmental Regulations

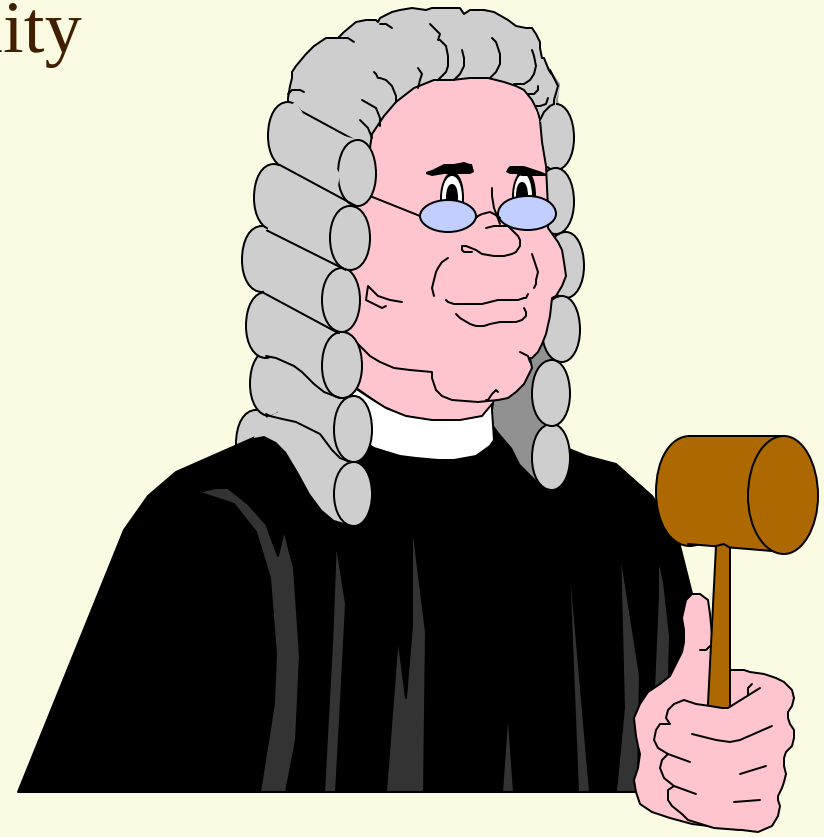
Environmental Regulations

Based on *Environmental Media*

▶ Air ▶ Water ▶ Land ▶ Groundwater	▶ Clean Air Act ▶ Clean Water Act ▶ Resource Conservation & Recovery Act ▶ Comprehensive Environmental, Response, Compensation, & Liability Act

Federal Facilities

- Had sovereign immunity
- Now waived in each environmental law
- Center liable for civil penalties
- individuals liable for criminal penalties



Amplified by Executive Orders

- Pollution Prevention
- Environmental Justice
- Affirmative Procurement and Recycling
- Environmental Management

Clean Air Act

- Permit to Install required for all new sources of air pollutants
- Asbestos rules regarding removal & disposal
- CFC’s
  - certified techs required
  - no venting

Clean Water Act

- GRC Discharges are Governed by Permit
- Only Storm Water is allowed in Storm Drains
- City tap water exceeds Chlorine permit levels!
- Prohibits Discharges of Oil to Navigable Waters
- Sanitary Discharges Governed by Pre-Treatment Rules
- Prior Approval for Waste Water with Minor Contamination Discharges

RCRA

- No treatment, storage or disposal of hazardous waste without a permit
- Any material mixed with or derived from a hazardous waste is considered hazardous

RCRA Terms

- Treatment - any action which changes the chemical or physical properties of a waste
- Storage - less than 90 days allowed without permit, if certain conditions are met
- Disposal - any leaking, spilling, deposit, dumping, etc..

Waste Management

- Contact Waste Management Team prior to activities that generate hazardous waste
- Submit a NASA C-260 to dispose hazardous waste or any contaminated material or equipment
- Only trained personnel can use Satellite Accumulation and 90-Day Storage Sites

90-Day Storage Sites

- 5 CE, SE
- 11
- 14
- 38
- 49
- 50
- 51
- 53
- 61
- 64
- 66
- 77
- 92
- 106
- 110
- 125
- 203
- 212
- 301

Satellite Accumulation Sites

- 4
- 5 basement, CE1, CE5
- 6
- 9 shop
- 16 shop
- 23 room 155
- 50 shop
- 51 room 109
- 77 rooms 219, 254
- 102 shop
- 203
- 142 room 160

CERCLA

- Covers past waste handling and emergencies
- Release of a hazardous material above reportable quantity must be reported to EPA
- Whoever transports, disposes, arranges for disposal of a hazardous substance is liable for response costs
- Assigns liability

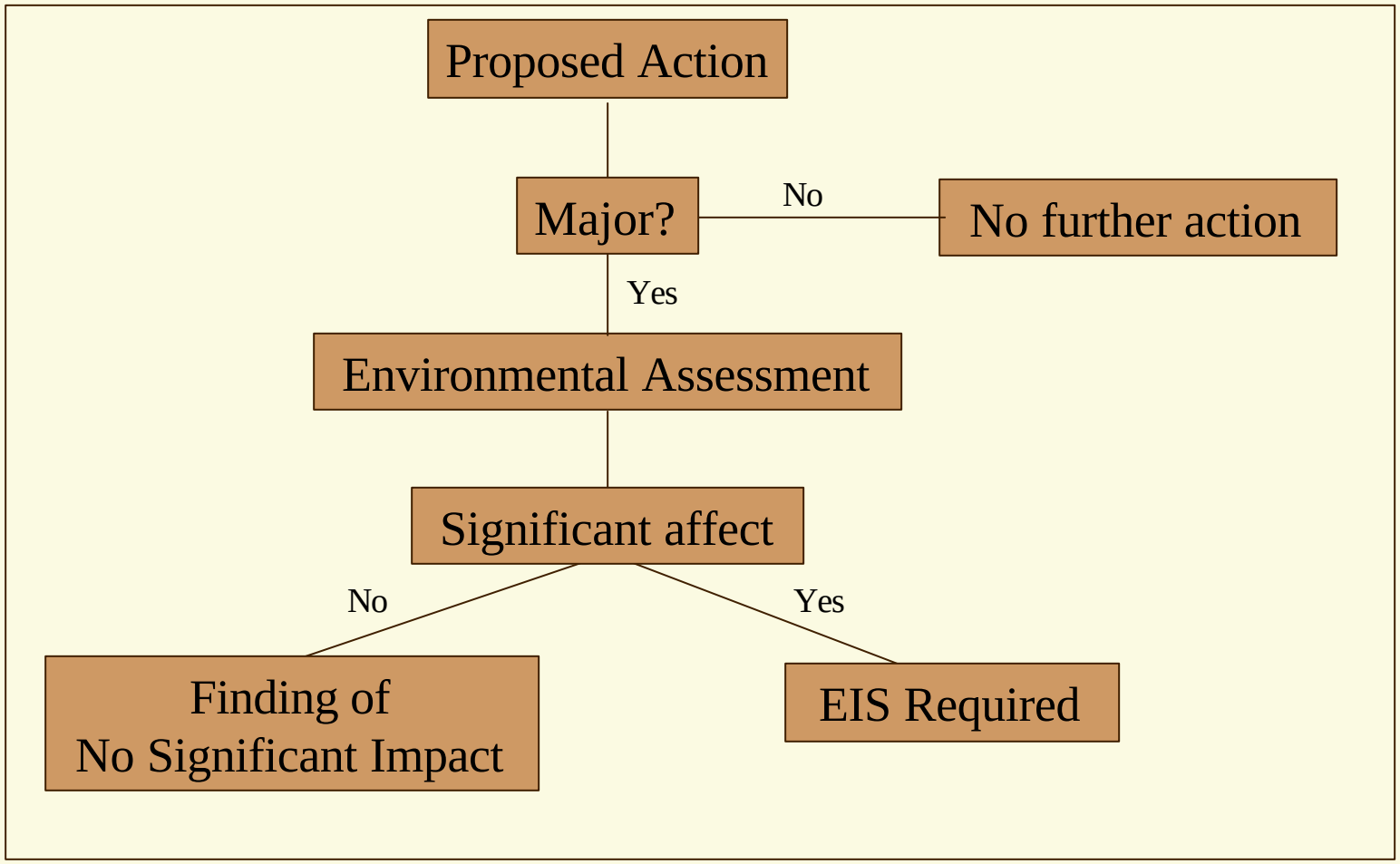
CERCLA at GRC

- GRC Hazardous Materials
  - Jet Fuel, Gasoline, etc..
  - Hydrogen
  - Refrigerants
  - Lab chemicals
- GRC Findings and Orders
- Soil

National Environmental Policy Act (NEPA)

- All projects must be reviewed for impacts
  - May lead to an Environmental Analysis
  - Any major action significantly affecting the human environment requires an environmental impact statement (EIS)
- Enforcement can mean project stopped
- Training in September 2002

NEPA Process



Summary

Why Are We Doing This?

To enable NASA's mission by protecting our workforce, the public, and through environmental stewardship.

Environmental Resources

- Emergency
  - Dial 911
- Complaints, Questions & Concerns
  - Environmental, Health & Safety Helpline
    - 3-8848
- Routine
  - Appropriate individual or EMO Division Office
    - 3-8842 or 3-3020

http://osat-ext.grc.nasa.gov/

Safety and Assurance Technologies Directorate

Glenn Research Center at Lewis Field

8000/SAT Directorate Office	8100/Risk Management Office	8200/Quality Management Office
8300/Glenn Safety Office	8400/Environmental Management Office	8500/Security Management and Safeguards Office
8010/Plum Brook Reactor Facility Decommissioning		
Click here for access to the internal Safety and Assurance Technologies Directorate Website (limited to NASA Glenn personnel only)		

Mission Success Starts with Safety

The NASA Glenn Research Center (GRC) Safety and Assurance Technologies (SAT) Directorate provides reliability, quality assurance, and system safety management and expertise to support GRC technical divisions, project offices, and contracted programs. Our tasks encompass research and development programs from conceptual design to launch and flight. Product assurance personnel manage contractors' product assurance efforts on major contracts and in-house programs. Consulting and technical expertise are provided for systems safety analyses, design reviews, design changes, electronic parts, contractor proposal and capability evaluation, monitoring of product assurance efforts, produce assurance auditing, reliability analysis, analytical studies, materials and processes and data systems. Management of the Center's Emergency Preparedness Program for on-site security, hazmat, and general disaster response and management.

GSO/EMO Philosophy

GSO and EMO are critical elements contributing to the success of all operations at the Center, by ensuring that our customers and partners have a safe and healthy workplace to support the Agency's Mission.

A simple truth…

- If management does not plan to prevent accidents, it is planning to have them.

Make HSE a driving wheel and not a trailer.